

TAXONOMY OF NEOTROPICAL PSYCHODIDAE (DIPTERA)  
1. PSYCHODA SPECIES OF WEST INDIES AND CENTRAL  
AMERICA WITH A KEY TO TRINIDAD SPECIES

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The recent acquisition of a large number of Neotropical moth flies has prompted the inception of a series of papers dealing with the taxonomy of the family from this region. It is anticipated that most of the study will be descriptions of new species and unlisted Neotropical records of previously described species. It appears likely that the geographic area will be largely the northern Neotropical region, although if specimens from other parts of the region become available they too will be included in the series.

The bulk of the specimens studied in the preparation of the present paper were received from Dr. T. H. G. Aitken of the Trinidad Regional Virus Laboratory, and sincere appreciation is extended to him for procuring the specimens. Nearly all the Trinidad (B.W.I.) records are based on Aitken's material. Gratitude is also expressed to Dr. Alan Stone for arranging the loan of relevant psychodid material from the U.S. National Museum, most of which is from the Canal Zone.

PSYCHODA ICHTHYCERCA Quate

*Psychoda ichthycerca* Quate, 1959, *Insects of Micronesia* (Bishop Museum), 12(4), in press.

Specimens examined: TRINIDAD: Tucker Valley, U.S. Naval Sta., VI-56, VII-6-56, X-26-56, XII-17-56, light trap, (Aitken).

Distribution: Micronesia, Trinidad.

PSYCHODA RAROTONGENSIS Satchell

*Psychoda rarotongensis* Satchell, 1953, *Proc. Roy. Ent. Soc. London* (B), 22:183; Quate, 1955, *Univ. Calif. Publ. Ent.*, 10:208.

*Psychoda lucia* Quate, 1954, *Proc. Hawaiian Ent. Soc.*, 15:349.

Specimens examined: NICARAGUA: Rama, Zelaya, VII-20-43, (Woke), COSTA RICA: Higuito, San Mateo, (Schild); San Pedro de Montes de Oca, X-32, (Ballou). PANAMA: Trinidad Rio, VI-9-12, (Busck); Tobago Isl., IX-30-26, *ex. ripe fruit Spondias lutea*, (Moline). CANAL ZONE: Ft. Claiton, II-2-56, light trap; Ft. Kobbe, IX-50, light trap; Barro Colorado Isl., XI-41, reared from *Calathea violacea*; Mojinga Swamp, I-9-53, light trap. PUERTO RICO: El Semil, Villalba, V-30-42, (Hoffman). TRINIDAD: U.S. Naval Sta., (Aitken); Tucker Valley, U.S. Naval Sta., III-19-56, X-5-56, XI-9-56, XII-17-56; Chaguaramas, U.S. Naval Sta., II-27-56, V-21-56, VII-15-56, X-11-56, XII-28-56; Macqueripe, U.S. Naval Sta., II-25-56, VIII-17-56,

XI-9-56, XII-17-56; San Jose Point, U.S. Naval Sta., I-4-57, IX-27-56, XI-12-56.

Distribution: Solomon Is., Cook I., Micronesia, Hawaiian Is., U.S., Nicaragua, Costa Rica, Panama, West Indies.

This widespread species undoubtedly owes its extensive range to human dispersal and probably breeds in plant materials carried aboard ships. It was the most abundant species represented in the collections studied.

#### PSYCHODA COCHLEARIA Satchell

*Psychoda cochlearia* Satchell, 1950, Proc. Roy. Ent. Soc. London, (B), 19:181 (descr., illus.); Quate, 1959, Insects of Micronesia (Bishop Mus.), 12(4), in press.

Specimens examined: CANAL ZONE: Ft. Kobbe, IX-50, light trap. TRINIDAD: Macqueripe, U.S. Naval Station, II-25-56, light trap, (Aitken); Tucker Valley, U.S. Naval Sta., VII-16-56, XII-17-56; Chaguaramas, U.S. Naval Sta., XII-28-56.

Distribution: Fiji, Micronesia, Canal Zone, Trinidad.

#### *Psychoda zetoscota* Quate, new species

(Figures 1, 2)

Female. *Head*: eyes separated by distance equal to one facet diameter; interocular suture absent; eye bridge with four rows of facets; frons with median band of hair extending posteriorly and nearly joining hair area of vertex; labellum with four teeth and two spines; palpus about one third the length of antenna, ratio of segments 4:5:5:7. Antenna with 15 segments, 14 and 15 separate, 15 about half the size of 14. *Wing*: Sc ending little before level of base of  $R_1$ ; bases of  $R_3$  and  $M_2$  lacking. *Genitalia* as figured; subgenital plate subrectangular with moderate apical concavity; genital digit present.

Measurements: holotype, antenna 0.7 mm.; wing length 1.2 mm.; wing width 0.6 mm. Paratypes, wing length 1.1–1.3 mm.; wing width 0.5–0.6 mm.

Male unknown.

*Holotype female* (U.S. National Museum): FORT CLAITON, CANAL ZONE, February 2, 1956, light trap. Paratypes, three females, same data. Other specimens: TRINIDAD; Tucker Valley, U.S. Naval Station, 27-VII-56, light trap, (Aitken).

Distribution: Canal Zone, Trinidad.

*P. zetoscota* is closely allied to the Formosan species *formosana* Tokunaga (1957, Sci. Rpt. Saikyo Univ. Agric., No. 9, p. 61) on the basis of the close similarity of the wing venation and female subgenital plate, but differs in that the antenna is 15-segmented and 16-segmented in *formosana*.

#### PSYCHODA PLATILOBATA Tokunaga

(Figures 3, 4, 5)

*Psychoda platilobata* Tokunaga, 1957, Sci. Rpt. Saikyo Univ. Agric., No. 9, p. 65.

Male. *Head*: eyes separated by distance equal to less than one facet diameter; interocular suture absent; eye bridge with four rows of facets; frons with median band of hair extending posteriorly and joining hair area of vertex; labellum with four teeth and two spines; palpus about one third the length of antenna, ratio of segments 4:4:5:6. Antenna broken (see female); all sensory filaments Y-shaped. *Wing*: Sc ending near level of base of  $R_1$ ; veins  $R_5$  and  $M_4$  very heavy; longitudinal veins with brown spots at apices, spots may be faint and indistinct; ratio of  $R_{2+3}:R_2:R_3=7:6:9$ , ratio of  $M_{1+2}:M_1:M_2=6:12:10$ . *Genitalia* as figured; dististyle with several irregular rows of spines, paramere pointed with notch before apex.

Measurements: wing length 1.7 mm.; wing width 0.5 mm.

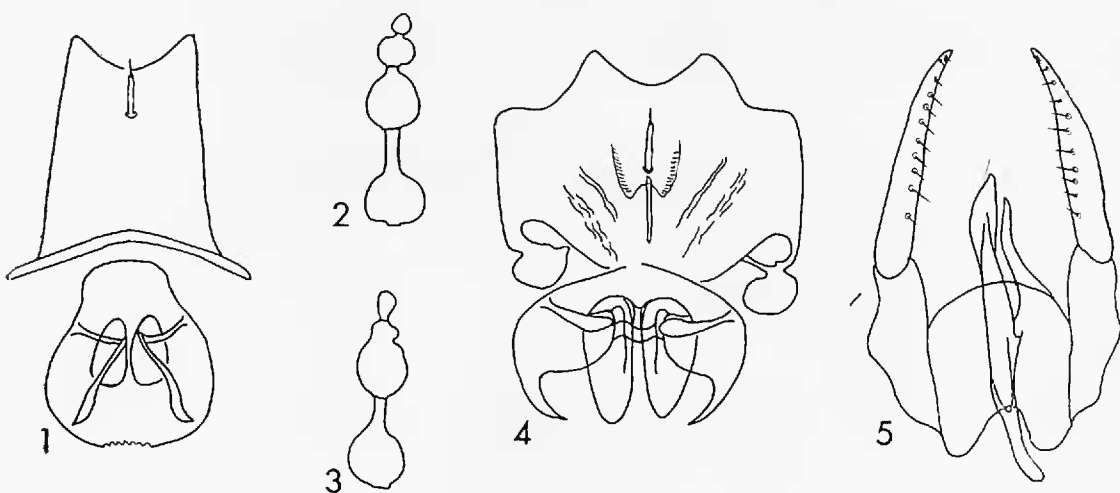
Female. Similar to male. *Head*: eyes separated by distance equal to one facet diameter. Antenna with 15 segments, 14 solidly fused to 13, 15 separate, about half the size of 14; 13 and 14 with tubercle-bearing spine. Sensory filaments dimorphic, those on third and fourth segments with three short arms, remainder Y-shaped. *Genitalia* as figured; subgenital plate heavily sclerotized, weakly bilobed.

Measurements: antenna 0.7-? mm.; wing length 1.2-1.6 mm.; wing width 0.5-0.6 mm.

Specimens examined: TRINIDAD: Tucker Valley, U.S. Naval Station, VI-56, VII-6-56, VIII-16-56, X-11-56, XI-1-56, XII-17-56. JAMAICA: Kingston, I-29-37, Sta. 361, (Chapin and Blackwelder).

Distribution: Trinidad, Jamaica, Formosa.

This common West Indian species may be recognized by the two heavy veins,  $R_5$  and  $M_4$ , the spots at the tips of the veins, the genitalic structure of both sexes, but especially by



#### EXPLANATION OF FIGURES

Fig. 1. *Psychoda zetoscota* Quate, female genitalia. Fig. 2. *P. zetoscota* Quate, antenna tip. Fig. 3. *P. platilobata* Tokunaga, antenna tip. Fig. 4. *P. platilobata* Tokunaga, female genitalia. Fig. 5. *P. platilobata* Tokunaga, male genitalia, dorsal view.

the unusual subgenital plate of the female and the dimorphic antennal sensory filaments of the female.

In spite of the surprisingly discontinuous distribution of the species, there is little doubt that the Neotropical specimens are conspecific with the Formosan. The unusual features of the wing venation, antennal sensory filaments, and female subgenital plate are too similar to regard the specimens otherwise. (My drawing of the female subgenital plate differs from that of Tokunaga in outline because I have illustrated the internal shelf-like structure which apparently was lost in Tokunaga's dissection and gives the plate a more quadrangular appearance.)

**PSYCHODA ALTERNATA** Say

*Psychoda alternata* Say, 1824, Narr. exp. source St. Peter's River, 2:358;

Quate, 1955, Univ. Calif. Publ. Ent., 10:218 (biblio., descr., and illus.).

Specimens examined: MEXICO: Orizaba, I-3-08, (Knab); Cordoba, I-3-08, IV-1-08, XII-18-07, (Knab). CANAL ZONE: Ft. Kobbe, VIII-54, (Field); same, IX-50, light trap. PUERTO RICO: Bayamon, I-21-34, (Anderson). TRINIDAD: Tucker Valley, U.S. Naval Station, III-19-56, VII-6-56, X-5-56, XI-9-56, light trap, (Aitken). JAMAICA: Newport, II-20-37, (Chapin and Blackwelder).

Distribution: Cosmopolitan. Mexico, Canal Zone, Jamaica, Puerto Rico, Trinidad.

**PSYCHODA ALTERNICULA** Quate

*Psychoda alternicula* Quate, 1955, Univ. Calif. Publ. Ent., 10:222 (descr. and illus.).

Specimens examined: MEXICO: Ciudad Valles, S.L. Potosi, XII-1-44, light trap, (Brookman). CANAL ZONE: Ft. Kobbe, IX-50, light trap. TRINIDAD: Tucker Valley, U.S. Naval Station, XII-7-56, light trap, (Aitken).

Distribution: U.S., Mexico, Canal Zone, Trinidad.

**PSYCHODA LATIVENTRIS** Berdén

*Psychoda lativentris* Berdén, 1952, Opusc. Ent., 17:111; Quate, 1955, Univ. Calif. Publ. Ent., 10:217.

Specimens examined: Tlalnepantla, Mexico, XI-13-56, (Snow).

Distribution: Holarctic. Mexico.

This species is included here because it probably will be found in Central America. Most likely it will not show up in Trinidad, as the extensive light trap collections have failed to reveal it, and it is commonly taken at light in North America.

***Psychoda gehrkeae*** Quate, new species

(Figures 6, 7)

Female. *Head*: eyes separated by distance equal to one facet diameter; interocular suture absent; eye bridge with four rows of facets; frons with median band of hair extending posteriorly and nearly joining hair area of vertex; labellum with four teeth and two spines; palpus about one-quarter the length of antenna, ratio of segments 5:5:5:5.5. Antenna with

16 segments, 14 and 15 partly fused, separated from 13; 16 separate, about one-half the size of 15; sensory filaments Y-shaped. *Wing*: Sc ending little beyond base of  $R_1$ ; ratio of  $R_{2+3}:R_2:R_3=8:7:10$ ; ratio of  $M_{1+2}:M_1:M_2=7:14:12$ . *Genitalia* as figured; subgenital plate with bulging sides and moderate apical concavity; genital digit long and slender.

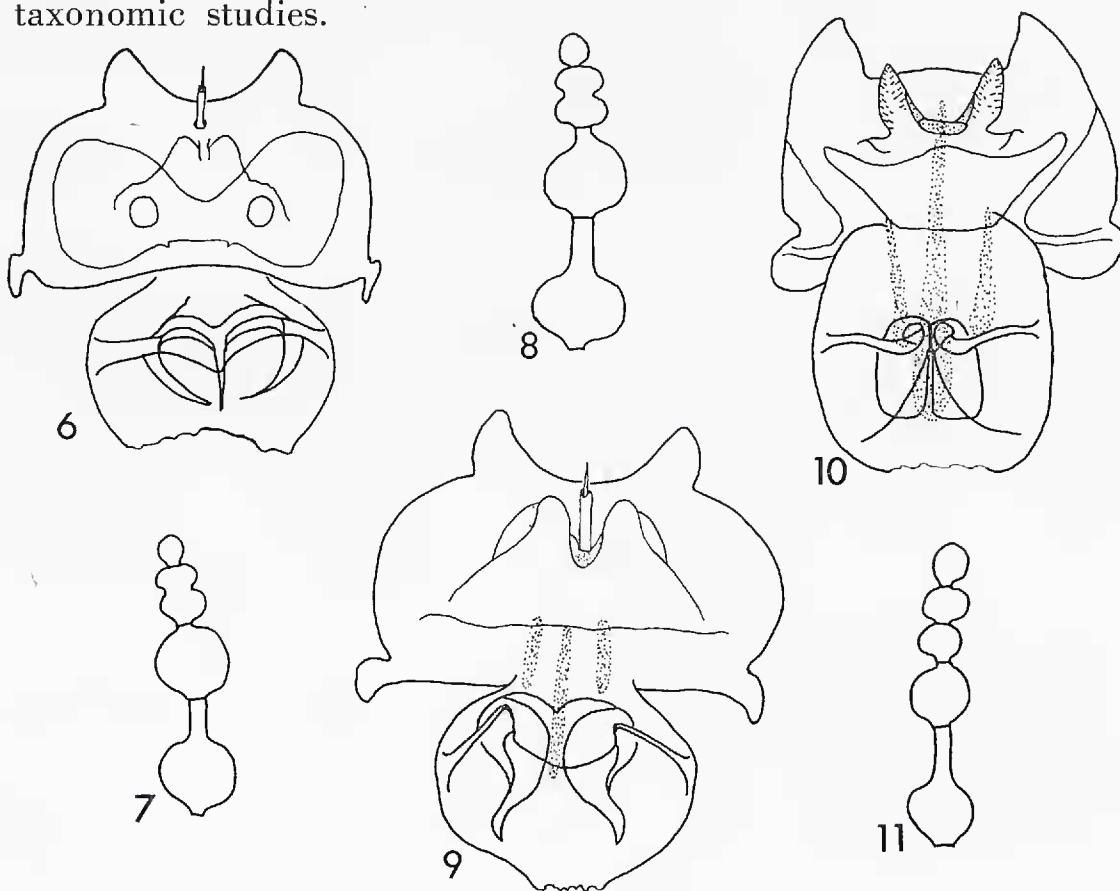
Measurements: holotype, antenna 0.8 mm.; wing length 1.3 mm.; wing width 0.5 mm. Paratypes, antenna 0.7–? mm.; wing length 1.3–1.6 mm.; wing width 0.5–0.6 mm.

Male unknown.

*Holotype female* (U.S. National Museum): TUCKER VALLEY, U.S. NAVAL STATION, TRINIDAD, November 19, 1956, light trap, (T. H. G. Aitken). Paratypes: four females, same data; one female, same data except VI-56; one female, same data except VII-16-56; one female, Macqueripe, U.S. Naval Station, Trinidad, VIII-2-56; one female, same data except XII-17-56.

Distribution: Trinidad.

This species is named in honor of Mrs. E. A. Gehrke in appreciation of her continued interest in and appreciation of taxonomic studies.



#### EXPLANATION OF FIGURES

Fig. 6. *Psychoda gehrkeae* Quate, female genitalia. Fig. 7. *P. gehrkeae* Quate, antenna tip. Fig. 8. *P. scotina* Quate, antenna tip. Fig. 9. *P. scotina* Quate, female genitalia. Fig. 10. *P. aitkeni* Quate, female genitalia. Fig. 11. *P. aitkeni* Quate, antenna tip.

***Psychoda scotina* Quate, new species**

(Figures 8, 9)

Female. *Head*: eyes separated by distance equal to one facet diameter; interocular suture absent; eye bridge with four rows of facets; frons with median band of hair extending posteriorly to above level of center of eye bridge, almost joining hair area of vertex; labellum with four teeth and two spines; palpus short, about one-quarter the length of antenna, ratio of segments 6:5:5:6. Antenna with 16 segments; segments 14 and 15 partly fused together, 16 separate, smaller than preceding segments; sensory filaments Y-shaped. *Wing*: Sc ending beyond base of  $R_1$ ; ratio of  $R_{2+3}:R_2:R_3=9:8:12$ , ratio of  $M_{1+2}:M_1:M_2=8:16:14$ . *Genitalia* as figured; apex of subgenital plate with two well defined lobes; genital digit long and slender.

Measurements: holotype, antenna broken; wing length 1.5 mm.; wing width 0.6 mm. Paratypes, antenna 0.8–0.9 mm.; wing length 1.3–1.5 mm.; wing width 0.5–0.6 mm.

Male unknown.

*Holotype female* (U.S. National Museum): FORT CLAITON, CANAL ZONE, February 2, 1956, light trap. Paratypes; 14 females, same data. Other specimens: TRINIDAD: Tucker Valley, U.S. Naval Station, VII-6-56, X-5-56, XII-17-56, light trap, (Aitken).

Distribution: Canal Zone, Trinidad.

***Psychoda aitkeni* Quate, new species**

(Figures 10, 11)

Female. *Head*: eyes separated by distance equal to one facet diameter; interocular suture absent; eye bridge with four rows of facets; frons with median band of hair extending posteriorly to below level of center of eye bridge, not joining hair area of vertex; labellum with two spines; palpus about one-third the length of antenna, ratio of segments 5:7:7:9. Antenna with 16 segments, terminal three subequal in size, separated; sensory filaments Y-shaped. *Wing*: Sc ending before base of  $R_1$ ; ratio of  $R_{2+3}:R_2:R_3=8:6:11$ , ratio of  $M_{1+2}:M_1:M_2=6:16:14$ . *Genitalia* as figured; apex of subgenital plate with rectangular concavity; V-shaped structure on internal face of plate; genital digit absent.

Measurements: holotype, antenna 0.8 mm.; wing length 1.4 mm.; wing width 0.6 mm. Paratypes, wing length 1.4–1.5 mm.; wing width 0.5–0.6 mm.

Male unknown.

*Holotype female* (U.S. National Museum): CHAGUARAMAS, U.S. NAVAL STATION, TRINIDAD, February 27, 1956, light trap, (T. H. G. Aitken). Paratypes, 10 females: Chaguaramas, U.S. Naval Station, Trinidad, VI-15-56, XI-9-56; Macqueripe, U.S. Naval Station, Trinidad, X-19-56; Tucker Valley, U.S. Naval Station, Trinidad, X-5-56, XI-9-56, XII-17-56. Other specimens: CANAL ZONE; Ft. Kobbe, IX-50, light trap; Ft. Claiton, II-2-56,

light trap; Mojinga Swamp, VII-15-52, light trap. PANAMA; Buena Vista, Transisthmian Hwy., Colon Prov., VIII-30-56, at light.

Distribution: Trinidad, Canal Zone, Panama.

*Psychoda aitkeni* is a common species in Trinidad and Panama occurring in quite large numbers in light trap collections. Only two other species of this area are more numerous in collections studied.

#### PSYCHODA PLAESIA Quate

*Psychoda plaesia* Quate, 1959, Insects of Micronesia (Bishop Museum), 12(4). In press.

Specimens examined: CANAL ZONE: Ft. Kobbe, IX-50, light trap.

Distribution: Canal Zone, Micronesia.

The wide distribution of this species is undoubtedly accounted for by rather recent dispersal by commercial transportation. Other species of the genus (e.g. *P. rarotongensis* Satchell) have a similar range.

#### KEY TO TRINIDAD SPECIES OF PSYCHODA

1. Bases of veins  $R_3$  and  $M_2$  lacking, bifurcations therefore incomplete....2  
Bases of veins  $R_3$  and  $M_2$  complete or only weakened at bifurcation.....3
2. Antennal segments 15 and 16 subequal in size.....*ichthyerca* Quate  
Antennal segment 15 about half the size of 16.....*zetoscota* Quate
3. Antenna with 14 or 15 segments.....4  
Antenna with 16 segments.....8
4. Antenna with 14 apparent segments (may actually be 15 but 14 greatly reduced and fused to 13).....5  
Antenna with 15 well defined segments.....6
5. Female subgenital plate hemispherical in general outline; aedeagus of male genitalia with small lateral shaft adjacent to main shaft near its center .....*rarotongensis* Satchell  
Female subgenital plate rectangular apically in general outline; aedeagus of male consisting only of simple main shaft.....*cochlearia* Satchell
6. Vein  $R_5$  (vein ending in wing tip) not noticeably thicker than other veins; female subgenital plate with deep apical concavity.....7  
Vein  $R_5$  definitely thicker than other veins; female subgenital plate with weak apical concavity.....*platilobata* Tokunaga
7. Female subgenital plate V-shaped, male aedeagus with lateral shaft straight and rounded at tip.....*alternata* Say  
Female subgenital plate Y-shaped; male aedeagus with lateral shaft curved and sharply pointed at tip.....*alternicula* Quate
8. Antenna segments 14 and 15 fused or partly fused together.....9  
Apical antennal segments clearly separated from each other.....10
9. Genital digit long, extending well beyond apex of subgenital plate; internal face of subgenital plate with pair of sac-like expansions marked with fenestra on either side of midline (male unknown)..*gehrkeae* Quate

- Genital digit not extending beyond apex of subgenital plate; plate without sac-like lobes on internal face (male unknown).....*scotina* Quate
10. Female subgenital plate with large, rectangular apical concavity (male unknown) .....*aitkeni* Quate
- Female subgenital plate with very shallow apical concavity; male aedeagus with long, sickle-like lateral shaft, surstyle short and stocky, only little longer than dististyle.....*plaesia* Quate

The following species have been recorded from the northern Neotropical region, but the brevity of the original descriptions and lack of specimens preclude their redescription and proper placement at the present time. (Williston's species are represented by single specimens only in the British Museum (Nat. Hist.) and unique type specimens, quite understandably, are not subject to loan.)

- Psychoda angustipennis* Williston, 1896, Trans. Ent. Soc. London, 1896:284. St. Vincent, Lesser Antilles. Type: Brit. Mus. (Nat. Hist.).
- Psychoda antennalis* Williston, 1896, Trans. Ent. So. London, 1896:283. St. Vincent. Type: Brit. Mus. (Nat. Hist.).
- Psychoda atraseta* Rapp, 1945, Jour. N.Y. Ent. Soc. 53:310. Barro Colorado I., Canal Zone. Type: Amer. Mus. Nat. Hist.
- Psychoda brevitarsa* Rapp, 1945, Jour. N.Y. Ent. Soc. 53:310. Barro Colorado I. Type: Amer. Mus. Nat. Hist.
- Psychoda eburna* Rapp, 1945, Jour. N.Y. Ent. Soc. 53:309. Barro Colorado I. Type: Amer. Mus. Nat. Hist.
- Psychoda maculosa* Rapp, 1945, Jour. N.Y. Ent. Soc. 53:309. Barro Colorado I. Type: Amer. Mus. Nat. Hist.
- Psychoda pallens* Williston, 1896, Trans. Ent. Soc. London, 1896:283. St. Vincent. Type: Brit. Mus. (Nat. Hist.).
- Psychoda punctatella* Townsend, 1897, Ann. Mag. Nat. Hist. ser. 6, 20:19. Vera Cruz, Mexico. Type: site unknown.

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SUBTROPICAL FRUIT PESTS. By Walter Ebeling. vi + 436 pp. 160 black-and-white illus. 8 color plates. University of California Division of Agricultural Sciences. May, 1959. Price \$7.00.

This complete reorganization and updating of Professor Ebeling's earlier work, "Subtropical Entomology," contains sections on control methods and materials, biology of citrus pests and biology of pests affecting non-citrus fruits. Separate chapters deal with citrus pests in the United States and in other countries, pests of avocado, grape, walnut, almond, pecan, olive, fig, date and minor subtropical fruits. Other topics include legislation and organizational controls, general artificial control, spray oils, fumigants, equipment and biological control. The book is intended for use as a reference work and practical guide for agricultural entomologists, chemical companies, pest control operators, agricultural extension workers, fruit growers, etc.—*Acting ed.*